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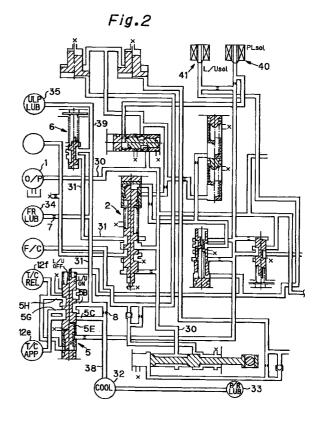
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## (54) Hydraulic pressure control device of automatic transmission

A toroidal continuously variable transmission (11) having power rollers (18A-18D) held between input discs (19, 29) and output discs (21, 22) and transmitting power and a torque converter (12) having a lock up clutch (12D) connected to the continuously variable transmission (11) are provided. The line pressure of a working fluid supplied from a pump (1) is adjusted by a pressure regulator valve (2), and the adjusted line pressure is introduced to a lock up control valve (5) for controlling a fluid pressure to be supplied to the lock up clutch (12D) of the torque converter (12) through a pressure passage (31). Further, an oil cooler (32) is interposed in a downstream portion of the lock up control valve (5). The lubricating circuit of the continuously variable transmission is separated into a first lubricating circuit 33 for lubricating a bearing member of the power rollers (18A-18D) and a second lubricating circuit (35) for lubricating a rolling surface between the input and output discs (19-22) and the power rollers (18A-18D). The first lubricating circuit (33) is connected to a downstream portion of the cooler (32) and the second lubricating circuit (35) is connected to an upstream portion of the lock up control valve (5).





## **EUROPEAN SEARCH REPORT**

Application Number EP 98 11 2666

Category	Citation of document with inc of relevant passa		Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,A	PATENT ABSTRACTS OF vol. 016, no. 290 (N 26 June 1992 (1992-0 & JP 04 078369 A (NI 12 March 1992 (1992- * abstract *	1,4	F16H57/04	
A	EP 0 707 165 A (FORD (FR); FORD MOTOR CO 17 April 1996 (1996- * figures 11A-A,11A-	-04-17)	CE 1,4	
A	US 4 880 091 A (ISH 14 November 1989 (19 * abstract; figures		1,4	
A	EP 0 450 495 A (NISS 9 October 1991 (1993 * column 11, line 8	l-10-09)	1,4	
A	US 5 090 527 A (HASHIBA MITSUAKI ET AL) 25 February 1992 (1992-02-25) * the whole document *		1,4	TECHNICAL FIELDS SEARCHED (Int.Ci.6)
A	US 4 464 946 A (KRAI 14 August 1984 (1984 * abstract; figure	4-08-14)	1,4	
	The present search report has t			
Place of search THE HAGUE		Date of completion of the search 12 October 200	4	Examiner n Prooijen, T
X:pai Y:pai doo A:ted	CATEGORY OF CITED DOCUMENTS rticularly relevant if taken alone rticularly relevant if combined with anott current of the same category thnological background n-written disclosure	T : theory or prit E : earlier paten after the filin D : document cit L : document cit	nciple underlying the t document, but public date led in the application ed for other reasons	invention lished on, or

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 98 11 2666

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-10-2000

cite	Patent document ed in search repo		Publication date		Patent family member(s)	Publication date
JP	04078369	Α	12-03-1992	JP	2661339 B	08-10-19
EP	0707165	 А	17-04-1996	US	5553694 A	10-09-19
				DE	69511497 D	23-09-19
				DE	69511497 T	16-12-19
				DE	69511981 D	14-10-19
				DE	69511981 T	23-12-19
				DE	69517909 D	17-08-20
				EP	0707162 A	17-04-19
				EP	0707164 A	17-04-19
				EP	0707163 A	17-04-19
				EP	0978672 A	09-02-20
				US	5612874 A	18-03-19
				US	5646842 A	08-07-19
				US	5586029 A	17-12-19
				US	5722519 A	03-03-19
				US	5758302 A	26-05-19
US	4880091	 A	14-11-1989	 JP	2787064 B	 13-08-19
				JP	63246560 A	13-10-19
EP	0450495	A	09-10-1991	JP	2663672 B	15-10-19
				JP	3288062 A	18-12-19
				DE	69114747 D	04-01-19
				DE	69114747 T	18-04-19
				US	5136890 A	11-08-19
US	5090527	A	25-02-1992	JP	2846362 B	13-01-19
				JP	6241310 A	30-08-19
				DE	4030467 A	18-04-19
US	4464946	Α	14-08-1984	JP	1782642 C	31-08-19
US				JP	4069294 B	05-11-19
US				JP	59137651 A	07-08-19

FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82